

# NOTES 01: DATA

Stat 120 | Fall 2025

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## 1 The Structure of Data

**Cases**

**Variables**

## 2 Types of Variables

**Quantitative**

**Categorical**

**Explanatory**

**Response**

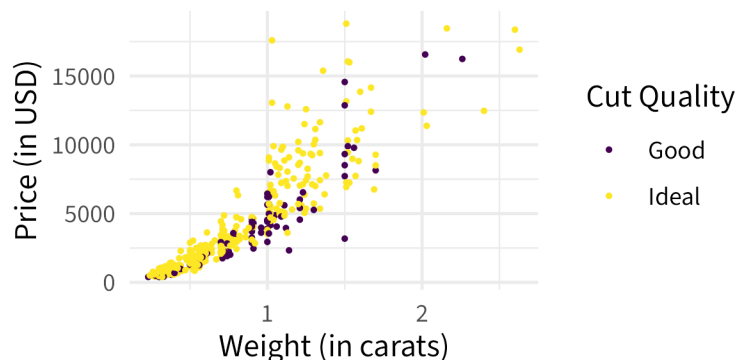
### 3 Examples

Label the *cases* and *variables*. For each variable, state whether it is *categorical* or *quantitative*. Indicate if there's clear *response* or *explanatory* variables

#### 3.1 Penguins

```
# A tibble: 344 x 8
  species island bill_length_mm bill_depth_mm flipper_length_mm body_mass_g
  <fct>   <fct>         <dbl>         <dbl>         <int>         <int>
1 Adeliae Torgersen      39.1           18.7           181          3750
2 Adeliae Torgersen      39.5           17.4           186          3800
3 Adeliae Torgersen      40.3           18           195          3250
4 Adeliae Torgersen      NA            NA            NA            NA
5 Adeliae Torgersen      36.7           19.3           193          3450
6 Adeliae Torgersen      39.3           20.6           190          3650
7 Adeliae Torgersen      38.9           17.8           181          3625
8 Adeliae Torgersen      39.2           19.6           195          4675
9 Adeliae Torgersen      34.1           18.1           193          3475
10 Adeliae Torgersen      42            20.2           190          4250
# i 334 more rows
# i 2 more variables: sex <fct>, year <int>
```

#### 3.2 Price of diamonds by carat and cut quality



#### 3.3 Is there a "Sprinting Gene"?

A gene called ACTN3 encodes a protein which functions in fast-twitch muscles. Some people have a variant of this gene that cannot yield this protein. To address the question of whether this gene is associated with sprinting ability, geneticists tested people from three different groups: world-class sprinters, world-class marathon runners, and a control group of non-athletes. In the same test, 6% of the sprinters had the gene variant, compared with 18% of non-athletes and 24% of the marathon runners.

Sketch out a possible dataset, and then answer the questions.